Trend Study 17-19-02

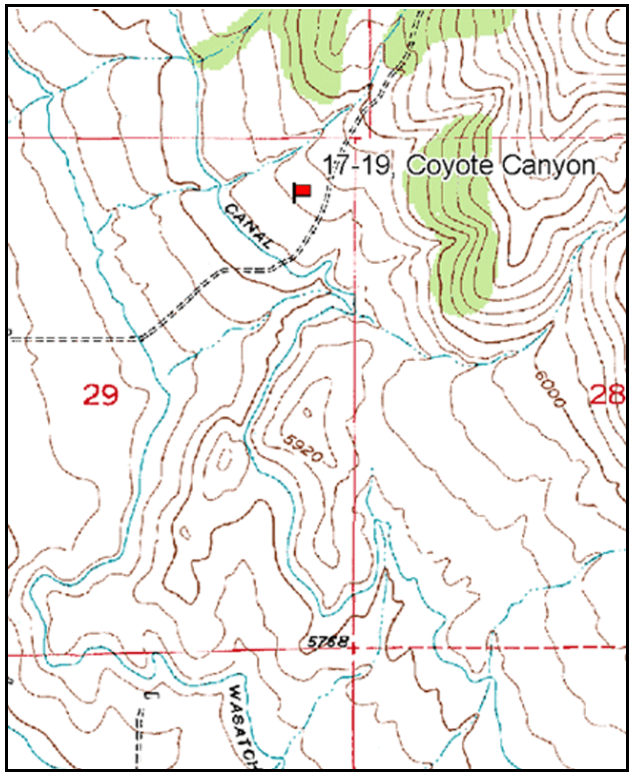
Study site name: Coyote Canyon . Vegetation type: Big Sagebrush .

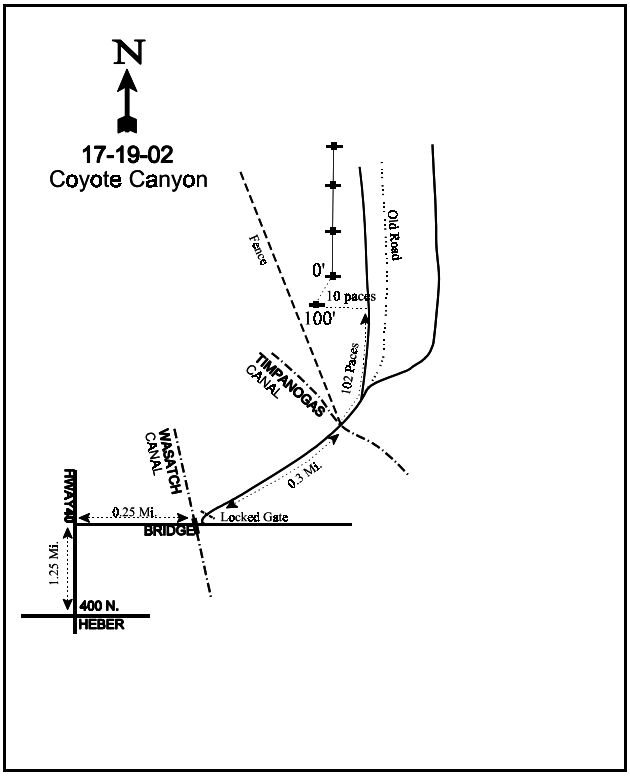
Compass bearing: frequency baseline 187 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 1 on 5ft.

LOCATION DESCRIPTION

From 400 North and Highway 40 (Main) in Heber, travel north for 1.25 miles and turn right onto a paved road. Proceed east for 0.25 miles to a left turn just past the Wasatch Canal (will need a key or combination to pass thru locked gate). Follow this road 0.3 miles to a fork immediately past Timpanogos Canal (locked gate with two combo locks). From the canal, take a left and walk 102 paces up the road. From this point, walk 10 paces west from the edge of the road to the 100-foot baseline stake. The 0-foot baseline stake is marked by a red browse tag. The baseline runs 187 degrees magnetic. The rest of the baseline runs off the 0-foot baseline stake in a direction of 345 degrees magnetic.





Map Name: Heber

Diagrammatic Sketch

Township 3S , Range 5E , Section 29

GPS: NAD 27, UTM 12S 4486977 N 466391 E

DISCUSSION

Coyote Canyon - Trend Study No. 17-19

This site, formerly known as Northeast of Heber, is located on the northeast side of the Heber Valley. The site lies on a gentle south to southwest facing slope at an elevation of 6,000 feet. It samples a mountain big sagebrush community with smaller quantities of other shrubs. In order to avoid a new road built parallel to the baseline, the 100 foot stake had to be moved about 25 feet to the west. It was also noted in 1996, that new homes had been built about 300-400 yards to the south and west. Some seeded grasses and forbs, which were planted along the road, occur in several of the belts. Deer use on the site has been high with elk use being considerably less. Pellet group transect data collected in 2002 estimated 166 deer days use/acre (410 ddu/ha) and 21 elk days use/acre (53 edu/ha). Some domestic sheep use occurred during the spring of 2002.

The soil type is "Beyyant Very Cobbly Loam." This is an alluvial soil that is well drained and has a coarse texture. The Beyyant soil is also less permeable to water and potentially more erodible. Textural and chemical analysis indicates a sandy clay loam with a slightly acidic reactivity (pH of 6.4). The effective rooting depth of the soil was estimated at nearly 12 inches in 1996, while average soil temperature was 61°F at a depth of 13 inches. Bare ground was moderate in 1984 and 1996. With drought conditions in 2002 and a decline in vegetation and litter cover, bare soil increased to nearly 33%. With poor herbaceous cover and a high proportion of bare soil, the erosion potential is moderately high on this site. Even with low precipitation in 2002, an erosion condition class assessment rated soils as slightly eroding. The ratio of protective cover to bare soil declined from 4.4:1 in 1996, to 2.6:1 in 2002.

Mountain big sagebrush density was estimated at 6,866 plants/acre in 1984. At that time, the decadency rate was 42% and utilization was light to moderate. Sagebrush density was estimated at 3,820 plants/acre in 1996 and 4,180 plants/acre in 2002. Much of the change in density is due to the expansion of the baseline in 1996, which gives a better estimate of shrub populations. Decadence declined between 1984 and 1996 to 22%, but again increased to 38% in 2002. The proportion of the population displaying poor vigor increased from 2% in 1996 to 23% in 2002. Heavy use increased from 2% to 48% over the same time period. Drought conditions in 2002 appeared to be negatively impacting the big sagebrush population. Sagebrush annual leader growth averaged 2.4 inches 2002. Bitterbrush is scattered throughout the site at a density of only 80 plants/acre. Use has been moderate to heavy and decadence moderate in 1996 and 2002 at 25%. Prickly pear cactus had an estimated density of 560 plants/acre in 2002. No other species were encountered.

The composition of the herbaceous understory is poor with annual species being dominant. Cheatgrass dominated the grass component in both 1996 and 2002, although it declined in nested frequency and cover in 2002 with drought. Perennial grasses are sparsely scattered throughout the site with most being found underneath sagebrush plants. In 2002, crested wheatgrass was utilized by sheep. The forb component is also dominated by annual species with pale alyssum being the most abundant. Sum of nested frequency for all perennial forbs was only 17 in 2002. With drought in 2002, annual species declined in nested frequency as well. One species of concern after the 1996 reading was tarweed. It occurred in very low numbers, but it was noted that mismanagement or disturbance could lead to a quickly expanding population. Tarweed was not sampled in 2002 and does not currently appear to be a threat to this site.

1984 APPARENT TREND ASSESSMENT

This entire area is characterized by essentially stable soil and vegetative conditions. The former line-intercept study identified some improvement in grass composition, density, production and total ground cover, but the dominant big sagebrush population was essentially unchanged. Big sagebrush density is high and will likely decline in the future with high intraspecific competition and no seedling or young plants being sampled. The herbaceous understory has poor composition with perennial species being limited.

1996 TREND ASSESSMENT

Soil trend is stable with a decrease in bare ground cover. Litter cover has also decreased, but combined with vegetative cover, provides adequate soil protection. The browse trend is also stable. Although there was a decrease in the density of mountain big sagebrush since 1984, this is more a result of the greatly increased sample size giving a more accurate estimate in 1996 than the actual loss of plants. Decadency declined from 42% to 22%, and vigor has improved. The composition of the herbaceous understory is poor with annual species being dominant. A fire in this area would destroy the browse community and lead to a field of annual species. Trend for the herbaceous understory is slightly upward as the sum of nested frequency for perennial species increased.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - slightly up (4)

2002 TREND ASSESSMENT

Trend for soil is down. Bare soil increased from 11% to 33%, while protective cover from vegetation and litter decreased. Erosion is only minimal because precipitation was low in 2002. The erosion hazard is moderately high on the site and erosion may become a problem when precipitation patterns return to normal. The ratio of protective cover (vegetation, litter, and cryptogams) to bare soil decreased from over 4:1 to 2.6:1. Trend for browse is slightly down. The density of mountain big sagebrush is relatively stable, but increases in decadence, poor vigor, and heavy use are causes for concern. Young recruitment also declined since 1996. The combination of high intraspecific competition and drought in 2002 are negatively impacting the sagebrush at the present time. Trend for the herbaceous understory is stable, but in poor condition. Composition remains poor as annual species are still dominant. Drought conditions in 2002 caused declines in nested frequency values of herbaceous species, especially annuals. Perennial species remain limited.

TREND ASSESSMENT
soil - down (1)
browse - slightly down (2)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 19

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'84	'96	'02	'84	'96	'02	'96	'02
G	Agropyron cristatum	a-	b24	c40	-	11	16	1.26	1.95
G	Agropyron intermedium	a-	a-	b6	-	-	4	.06	.04
G	Agropyron spicatum	8	7	-	4	2	-	.06	-
G	Bromus japonicus (a)	-	2	8	-	1	3	.00	.04
G	Bromus tectorum (a)	-	b368	a236	-	100	89	21.32	2.78
G	Oryzopsis hymenoides	-	-	-	-	-	-	.03	-
G	Sitanion hystrix	33	31	32	16	14	15	.66	.17
G	Stipa comata	-	1	4	-	1	2	.03	.03
Total for Annual Grasses		0	370	244	0	101	92	21.33	2.82
Total for Perennial Grasses		41	63	82	20	28	37	2.12	2.21
Total for Grasses		41	433	326	20	129	129	23.45	5.03

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'84	'96	'02	'84	'96	'02	'96	'02
F	Agoseris glauca	-	6	-	-	2	-	.01	-
F	Allium acuminatum	6	11	6	4	7	3	.03	.01
F	Alyssum alyssoides (a)	-	$_{a}$92	$_{b}$133	-	35	52	.81	.64
F	Collomia linearis (a)	-	$_{b}$13	$_{a}$-	-	8	-	.04	-
F	Collinsia parviflora (a)	-	2	3	-	2	2	.01	.01
F	Epilobium brachycarpum (a)	-	$_{b}$23	$_{a}$-	-	13	-	.06	-
F	Gayophytum ramosissimum (a)	-	$_{a}$-	$_{b}$29	-	-	13	-	.09
F	Hedysarum boreale	-	2	-	-	1	-	.00	-
F	Lactuca serriola	-	-	-	-	-	-	.00	-
F	Linum lewisii	$_{a}$-	$_{b}$25	$_{a}$-	-	11	-	.49	-
F	Madia glomerata (a)	-	$_{b}$9	$_{a}$-	-	6	-	.03	-
F	Medicago sativa	-	1	1	-	1	1	.03	.00
F	Microsteris gracilis (a)	-	8	7	-	4	3	.02	.01
F	Orthocarpus spp. (a)	-	$_{b}$38	$_{a}$-	-	19	-	1.05	-
F	Phlox longifolia	-	5	4	-	4	2	.02	.01
F	Polygonum douglasii (a)	-	$_{b}$46	$_{a}$5	-	19	2	.09	.01
F	Ranunculus testiculatus (a)	-	-	1	-	-	1	-	.00
F	Schoencrambe linifolia	-	-	3	-	-	1	-	.00
F	Sisymbrium altissimum (a)	-	-	4	-	-	2	-	.01
F	Tragopogon dubius	-	2	3	-	2	1	.01	.00
Total for Annual Forbs		0	231	182	0	106	75	2.12	0.78
Total for Perennial Forbs		6	52	17	4	28	8	0.60	0.03
Total for Forbs		6	283	199	4	134	83	2.73	0.82

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 19

Type	Species	Strip Frequency		Average Cover %	
		'96	'02	'96	'02
B	Artemisia tridentata vaseyana	89	88	18.38	20.00
B	Opuntia spp.	30	19	1.27	.52
B	Purshia tridentata	4	4	.21	.30
Total for Browse		123	111	19.87	20.82

CANOPY COVER -- LINE INTERCEPT
Herd unit 17 , Study no: 19

Species	Percent Cover	
	'96	'02
Artemisia tridentata vaseyana	-	21.50
Opuntia spp.	-	.58
Purshia tridentata	-	.08

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 19

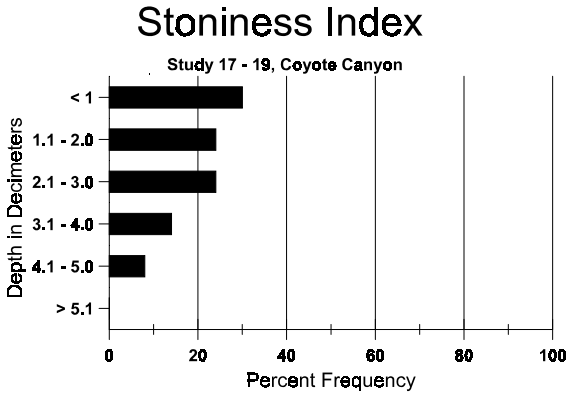
Species	Average leader growth (in)
	'02
Artemisia tridentata vaseyana	2.4

BASIC COVER --
Herd unit 17 , Study no: 19

Cover Type	Nested Frequency		Average Cover %		
	'96	'02	'84	'96	'02
Vegetation	373	307	2.00	39.08	25.59
Rock	138	137	6.25	8.19	8.55
Pavement	71	76	3.50	.35	.54
Litter	395	374	71.00	56.29	48.02
Cryptogams	25	22	1.75	.43	.45
Bare Ground	181	276	15.50	11.37	32.95

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 19, Coyote Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
11.7	61.0 (12.7)	6.4	46.2	26.1	27.7	3.6	34.4	160.0	.5



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 19

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'96	'02	'02	'02
Sheep	-	12	269	21 (51)
Rabbit	11	14	-	-
Elk	5	3	278	21 (53)
Deer	47	58	2158	166 (410)
Cattle	-	1	-	-

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 19

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Artemisia tridentata vaseyana																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	20	-	-	-	-	-	-	-	-	20	-	-	-	400			20
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	33	1	-	-	-	-	-	-	-	34	-	-	-	680			34
	02	13	-	3	-	-	-	-	-	-	16	-	-	-	320			16
M	84	33	26	1	-	-	-	-	-	-	59	-	1	-	4000	26	32	60
	96	72	42	1	-	-	-	-	-	-	115	-	-	-	2300	23	41	115
	02	32	25	55	-	-	1	-	-	-	101	-	12	-	2260	20	31	113
D	84	30	10	3	-	-	-	-	-	-	35	-	7	1	2866			43
	96	15	23	3	-	1	-	-	-	-	38	-	-	4	840			42
	02	22	15	41	-	1	1	-	-	-	44	-	3	33	1600			80
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	1440			72
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	1580			79

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	35%	04%	09%	-44%
'96	35%	02%	02%	+ 9%
'02	20%	48%	23%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	6866	Dec:	42%
	'96	3820		22%
	'02	4180		38%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	96	2	-	-	2	-	-	-	-	-	4	-	-	-	80			4
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	84	12	-	-	-	-	-	-	-	-	12	-	-	-	800	5	12	12
	96	43	-	-	1	-	-	-	-	-	42	-	2	-	880	5	13	44
	02	22	-	1	1	-	-	-	-	-	24	-	-	-	480	6	12	24
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	3	-	-	-	-	-	-	-	-	1	-	-	2	60			3
	02	3	-	-	-	-	-	-	-	-	-	-	-	3	60			3
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	-10%
'96	00%	00%	08%	-45%
'02	00%	04%	11%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	1133	Dec:		0%
'96	1020			6%
'02	560			11%

Purshia tridentata

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	84	-	2	-	-	-	-	-	-	-	1	-	1	-	133	17	22	2
	96	-	3	-	-	-	-	-	-	-	3	-	-	-	60	15	31	3
	02	-	-	3	-	-	-	-	-	-	3	-	-	-	60	14	41	3
D	84	-	-	2	-	-	-	-	-	-	1	-	1	-	133			2
	96	-	-	-	-	1	-	-	-	-	1	-	-	-	20			1
	02	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	50%	50%	50%	-70%
'96	100%	00%	00%	+ 0%
'02	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	266	Dec:		50%
'96	80			25%
'02	80			25%